A STUDY OF Land Development Costs IN THE Peace River Region 1984

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A STUDY OF LAND DEVELOPMENT COSTS IN THE PEACE RIVER REGION 1984

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INTRODUCTION

Background

The Peace River Region is a vast area which still contains large areas of potentially arable land. Much of this land, in the form of smaller parcels, is owned by individuals. In addition there remain large blocks of crown land that are also suitable for agricultural development.

Not all land with agricultural potential should be cleared and brought under cultivation. Some lands are more valuable in their natural state for erosion control, stream flow control, and to provide wildlife and recreational areas.

Development of land for agriculture requires the removal of the native cover; breaking of the sod and cultivation to kill existing vegetation; removal of roots, rocks and stumps, and drainage of low lying wet areas. All of this must be done before cereal, oilseed or forage crops can be grown.

The costs of land development are large and should be carefully considered. Cash costs range from $185 to $275 per acre and may be as high as $300 per acre for land with large mature tree growth. If the cost of raw land, wear and tear on equipment, and labour are included, the total cost often approaches, and in some cases surpasses the cost of land already under cultivation. Budgeting to determine feasibility,

adequate financing, and good equipment are essential to the success of a land clearing project.

Objective

This study considers the cost of bringing forested land in the Peace River Region into agricultural production.

Methodology

Data were collected through on-farm interviews and interviews with custom operations. Published and unpublished cost information was also used.

PHASES OF DEVELOPMENT

I Brushing

- brushing is most commonly done with a V cutter on a caterpillar tractor when the ground is frozen and snow cover is light;
- trees can also be walked down (raised dozer blade) when the ground is not frozen;
- the size of area done at any one time depends largely on the financial resources available;
- the cost of this operation and several of the following ones are affected by factors such as tree size, tree density and type of terrain.[3)]

II Piling, Burning, Repiling, Burning

- cleared tree cover is windrowed with a brush rake (bulldozer blade with spikes along bottom edge - organic matter and dirt are saved and not pushed into the windrows);
- the operations of burning of windrows, repiling and burning repiles are done in early June;
- labour for this stage is commonly provided by the landowner;
- repiling, followed immediately by land breaking, is usually done by the custom operator.

III Breaking

- June breaking has been shown to provide the best crop yields the following year[4,6)];
- Land breaking is most commonly done with a breaking plow and caterpillar;

- a breaking disc can be used when developing land for use as pasture[5];
- rotovator units, where available, work well on rock free land where native cover was light.

IV Follow-up Operations

- several passes with a heavy disc and tractor are required to "work down" the new land shortly after breaking;
- working down is often followed by a floating operation to smooth the field surface;
- several workings throughout the summer, alternating between root raking and tillage operations, prepare the land for seeding the following spring;
- where enough roots remain to present problems, the land may be raked one or more times after harvest of the first crop.

V Cropping

The choice of crops to be grown on new lands is dictated by varying factors:

- amount of roots remaining on the new land;
- topography, good slope and drainage allow earlier seeding than poorly drained land;
- the amount of open land in a given area can affect length of growing season;
- location, altitude and distance from major river systems also affect length of growing season;
- soil conditions including pH , organic matter, etc.

No general croppping pattern for new land is evident in the region, and in 3-5 years new land is no longer differentiated from land that has been in production for a longer period of time. In the first years, some chemical costs are spared until weeds such as wild oats gain a foothold. Recommended fertilization rates for new land are very similar to those for established farmland. Early breaking can reduce nitrogen fertilizer requirements for the first crop.[4,6)]

Custom Rates For Development

Table I presents a range of custom rates currently in effect for the various stages of the land development process. As can be seen from the table, it is possible to contract out all work. However, most landowners do a considerable part of the work themselves.

TABLE I: Range of Custom Charges for Land Development Work[3)]

Custom Work	Cost Per Acre	
	Most Common	Range
Brushing and Piling	$85-90	$70-140
Repiling	14	10-20
Plowing	38	32-44
Rotovating	80	70-95
Discing - Breaking (2x)	56	48-66
Working Down (2x)	25	22-35
Root Raking	15	13-20

Development Time Frame

Land development over a period of one year has become a common time frame where proper financing is present and good equipment is available. In this way, total costs are kept to a minimum and the new land is brought into production in the shortest time possible.

At times, however, land development does take longer than one year. This can occur as a result of various factors:

- in some areas, and often in dry years, brush burning permits may not be issued until the fall. In such instances, only the land between bush windrows is brought to or near seedbed condition in the first year;
- wet weather can delay plowing and/or working down into the second, or even third year;
- inadequate financing and/or equipment may delay completion.

Extra costs are associated with a longer developement period of 2 years compared to one year. These would include:

- 1 year's interest on the initial cost of the land and on all monies spent on development in year 1;
- loss of 1 crop;
- a probable higher per acre cost to have the custom operator return, for example, to repile and plow the 10-20% area occupied by windrows if they were not done in year 1.

ASSUMPTIONS SPECIFIC TO ONE YEAR AND TWO YEAR DEVELOPMENT PERIODS

1. The order and timing of the land development operations reflect actual methods used by a random group of landowners in the Peace River Region.

2. For most landowners interviewed, land development was being done over a period of one year and this was used as the basis for Table II. Table III demonstrates costs associated with a longer development period.

3. The work done by custom operators includes brushing, piling, repiling and plowing. The work done by the landowner includes burning, floating discing and root raking. It was assumed that the landowner rented the root rakes and used his own tractor, disc and float.

4. Custom rates were determined from landowners and from information generously supplied by the Lands Division, Energy and Natural Resources (Summarized in Table I).

   The rates used were:

Brushing and Piling	$87.00/ac
Repiling	$14.00/ac
Plowing	$38.00/ac.

   These rates represent costs for rock free, level terrain.

5. Clearing and breaking were most often done in 80-100 acre parcels. Smaller parcels might have higher per acre costs.

6. Calculations used for per acre machinery charges were as follows:

(a) Float 14' - no cost attributed to the float, usually made of scrap or low cost materials (5 ac/hr.)

(b) Drum Rake - used for first raking operation, $300/day ÷ 14 hrs use per day at 2 acres per hour = $10.71/acre

(c) Wheel Rake - used for second raking operation, $150/day ÷ 14 hrs use per day at 3.5 acres per hr = $3.06 per acre

(d) Offset Disc, Double 14' - assumed annual farm use of 160 hrs (cost $12,300, resale value at 10 yrs of $2,200) 4 ac/hr. Costs are based on formulas provided in the Alberta Agriculture publication "Farm Machinery Costs" agdex 835-12.[2)]

Cash Cost	$5.20/hr	$1.30/acre
Non Cash Costs	$11.75/hr	$2.94/acre

(e) Tractor (175 hp, 4WD) - assumed annual farm use 450 hrs (cost $79,000, resale value at 10 years $22,000). Costs as determined in (d).

Cash Costs	$18.29/hr
Non Cash Costs	$27.80/hr

Tractor costs per acre for the following operations:

	Float	Drum Rake	Wheel Rake	Disc
Cash Costs ($)	3.66	9.15	5.23	4.57
Non Cash ($)	5.56	13.90	7.94	6.95

7. The charge for landowners labour was set at $6.50/hr. Actual tractor time was doubled to reflect the time required for burning windrows, repiles, and for root cleanup, etc.[1)] Most of this non-tractor labour is used in the later part of the development period.

8. Interest on investment in land and equipment was calculated at 12%. Interest on operating costs was calculated at 13% on the previous years' costs plus ½ of current year's costs.

9. Forested land was valued from $85 to $100/arable acre. For the purpose of this report, a value of $90/acre was used.

TABLE II: Cost of Land Development - One Year Development Period

	Land Costs	Cash Costs	Non-Cash Costs	Total Cost
		-$/ACRE		
Raw Land	90.00			90.00
Brushing & Piling		87.00		87.00
Repiling		14.00		14.00
Plowing		38.00		38.00
Discing (2x)		11.74	19.78	31.52
Floating		3.66	5.56	9.22
Raking - Drum Rake		19.86	13.90	33.76
Discing (1x)		5.87	9.89	15.76
Raking - Wheel Rake		8.29	7.94	16.23
Sub-Total (Excluding Labour & Interest)	90.00	188.42	57.07	335.49
Landowners Labour [a]			22.49	
Interest on Operating Capital (13%)		12.25		12.25
Interest on Land (12%)		10.80		10.82
Sub-Total (Labour & Interest)		23.05	22.49	45.54
TOTAL	90.00	211.47	79.56	381.03

Total Development Cost Per Acre $381.03

a) Labour - 100 acres (doubled to reflect time required for burning windrows, repiles and root clean up)

Discing (25 x 2)	50 hrs
Floating	20 hrs
Root Raking - Drum	50 hrs
Discing	25 hrs
Root Raking - Wheel	28 hrs
	173 hrs

173 x 2 = 346 hrs.
346 x $6.50 = $2249;
$2249 ÷ 100 = $22.49/ac

TABLE III: Cost of Land Development - Two Year Development Period

Year 1	Land Costs	Cash Costs	Non-Cash Costs	Total Cost
		-$/ACRE-		
Raw Land	90.00			90.00
Brushing and Piling		87.00		87.00
Plowing 80% x 38.00		30.40		30.40
Discing 80% (2x)		9.39	15.82	25.21
Floating 80%		2.93	4.45	7.38
Raking - Drum Rake 80% (1x)		15.89	11.12	27.01
Sub-Total	90.00	145.61	31.39	267.00
(Excluding Labour and Interest)				
Landowners Labour [a]			6.24	6.24
Interest on Operating Capital (13%)		9.46		9.46
Interest on Land (12%)		10.80		10.80
Sub-Total		20.26	6.24	26.50
(Labour & Interest)				
TOTAL YEAR 1	90.00	165.87	37.63	293.50

a) Labour 100 acres

Discing	40 hrs
Floating	16 hrs
Root Raking-Drum	40 hrs
	96 hrs

96 x $6.50 = $624
$624 ÷ 100 = $6.24/acre

TABLE III: (Continued) Cost of Land Development - Two Year Development Period

Year II	Land Costs	Cash Costs	Non-Cash Costs	Total Cost
		-$/ACRE-		
Burning				
Repiling		14.00		14.00
Plowing 20%		7.60		7.60
Discing 20% (2x)		2.35	3.96	6.31
Floating 20%		.73	1.11	1.84
Raking - Drum Rake 20% (1x)		3.97	2.78	6.75
Discing 100% (1x)		5.87	9.89	15.76
Raking - Wheel Rake 100% (1x)		8.29	7.94	16.23
Sub-Total (Excluding Labour and Interest)		42.81	25.68	68.49
Landowners Labour [b]			16.25	16.25
Interest on Operating Capital (13%)		24.34		24.34
Interest on Land (12%)		10.80		10.80
Sub-Total (Labour and Interest)		35.14	16.25	51.39
TOTAL YEAR 2		77.95	41.93	119.88
Cost Over Two Years	90.00	243.82	79.56	413.38

Total Development Cost Per Acre	$413.38
Add Opportunity Cost - Loss of One Crop - Approximate Net Income	60.00
	$473.38
Extra Cost Over 1 Year Development Period	$ 92.35

b) Labour 100 acres (doubled to reflect time required for burning windrows, repiles and root cleanup)

Discing	10 hrs
Floating	4 hrs
Root Raking-Drum	10 hrs
Discing	25 hrs
Root Raking-Wheel	27 hrs
	77 hrs
Plus Non-Tractor Labour	173 hrs
	250 hrs

250 x $6.50 = $1625
$1625 ÷ 100 = $16.25/acre

SUMMARY

Bringing forested land into agricultural production is an activity which has been and will remain common for many years. The amount of land development taking place at any one time is to some extent related to the cost of land already under cultivation.

The costs determined in this report for a one year development period is $381 per acre. In light of current crop land values which range from $325-450/acre, this amount could be applied to the purchase of an approximately equal amount of cultivated land.

In those instances where development takes longer than one year the total cost of the new land will be at least $473 per acre or $92 higher than the cost of development over one year. In this instance it may be more beneficial for a farmer to purchase already cultivated land.

Many factors can affect the decision to develop land. Proximity to present holdings, the relative availability of cultivated land and forested land, and cultivated land prices are all factors which will affect the decision making process.

Once a decision is made however, it can be appreciated that careful budgeting and planning around a certain time frame must be the prime considerations in any land development plan.

REFERENCES

1) Alberta Department of Agriculture Production and Resource Economics Branch 1980, A Cost Study of Bringing Virgin Land into Production in the High Prairie Area.

2) Alberta Department of Agriculture Production and Resource Branch 1982, Farm Machinery Costs, Agdex 835-12.

3) Alberta Department of Energy and Natural Resources 1984, various unpublished lists, tables including Custom Work Bid Lists, Contractor Lists and Contracted Cost Per Unit of various land development operations.

4) Experimental Farm Canada Department of Agriculture, Beaverlodge, Alberta 1964, Research Report 1962-64.

5) Experimental Farm Canada Department of Agriculture, Beaverlodge, Alberta, 1965, Development of Alberta Bushland for Agriculture.

6) Hennig, A.M.F., 1965. Effect of Methods Used to Break Virgin Wooded Soils on the Yields of Wheat and Flax. Can. J. Soil Sci. Vol. 95 (1965).